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Effects of double qualifications on various dimensions of job satisfaction

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Abstract

Using a sample of graduates from a unique employee survey, this paper analyses the individual effects of double qualifications, i.e. of first taking up vocational training after obtaining the German upper secondary school-leaving certificate (Abitur) instead of going straight on to university. Our estimations take into account the potential endogeneity of having a double qualification. We find that the effects of double qualifications on wages and on eleven single dimensions of job satisfaction are either significantly positive or insignificant, but never significantly negative. Our results suggest that individual risk considerations are of minor importance in the context of double qualifications; however, such complex educational paths provide valuable labour market information for individuals.

Keywords: vocational training, higher education, earnings, job satisfaction
JEL Classification: J24, J31

1. Introduction

Due to the demographic and organizational changes which tend to raise the relevance of lifelong learning (see, e.g. Spitz-Oener, 2006), «front-loaded» education systems seem to become increasingly dysfunctional. As a consequence, in Europe efforts have been increased to shorten the time which individuals need to obtain their first job-qualifying university degree.[2] However, in Germany the transition from school to work could be even faster if the number of young people who take up more than one course of vocational training or education would be reduced. Although the proportion of individuals who passed the Abitur examinations and concluded a new vocational training contract has declined during the last decade from 28% (1995) to

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2 The discussion in other European countries is summarized, e.g. in Manning (2001). Vocational, academic and mixed individual educational paths are studied by Tuor & Backes-Gellner (2010) and Backes-Gellner et al. (2010) for Switzerland and Dearden et al. (2002) for Great Britain.

24% (2005) (Institut der deutschen Wirtschaft, 2007), the percentage of individuals commencing vocational training after having gained the Abitur as their highest school qualification has increased from 14% in the year 2002 to 21% in the year 2010 (Bundesinstitut für Berufsbildung, 2012, 158). According to analyses based on the Swiss Labour Force Survey 1999–2005 which have been conducted by Tuor & Backes-Gellner (2010, 503), in Switzerland (a country whose educational system is similar to the German educational system) more than 10% of the individuals with a higher tertiary education have completed both academic and vocational qualifications during their period of education.

In the light of the prevalence of double qualifications of university and polytechnic graduates it is surprising that the number of studies on this topic is rather limited. While the focus of the former studies is on the incidence of double qualifications and their effects on individual earnings and some selected dimensions of job satisfaction (Hammen, 2008, 2009; Bellmann & Janik, 2010), there are no microeconomic studies on the effects of double qualifications on various dimensions of job satisfaction (e.g. satisfaction with wages, working time, physical working conditions and working climate, cf. Warr, 1999). It was not until the mid-1970s, however, that economists began to study job satisfaction. Previously, this field of research had been predominantly analysed by psychologists.

Although the work of Büchel and Helberger (1995) – who stated that risk considerations are important for an individual's decision to go into vocational training before taking up studies at a university – did not remain without critique, probably due to a lack of appropriate data this topic has not been taken up again more recently.[2] Since we are using the BIBB/BAuA Employee Survey 2006, our study is based on a data set that meets these data requirements as it contains complex retrospective information on all education and training paths which the surveyed individuals have completed.

On the individual level we are also interested in the validity of the hypothesis put forward by Buttler and Tessaring (1993) who argued that education cannot be regarded as a requirement for certain occupations any longer; instead, nowadays education increases an individuals' overall occupational options. Indeed, the great advantage of the Abitur is that it leaves all career paths open.

In order to investigate the effects of double qualifications on various dimensions of job satisfaction, the rest of the paper is structured as follows. Section 2 presents related research and the theoretical background of our empirical analysis. Section 3 describes the data set and reports the descriptive results. We discuss our empirical strategy, model specification and econometric results in Section 4. The last section concludes.

2 The studies by Behrens et al. (2008), Pilz (2008, 2009a, 2009b) and Lauterbach and Weil (2008, 2009) can be regarded as exemptions in this respect. Furthermore, the study conducted by Büchel and Helberger (1995) is based on data which refers to the early 1990s, when wage polarization had just begun (Antonczyk et al., 2010). Since then, the incentives for individuals to take up academic studies have increased considerably.

2. Related research and theoretical background

The comparatively high percentage of individuals who pass the Abitur examinations and conclude a new vocational training contract is traced back by Büchel and Helberger (1995) to the risk-related considerations of young people who want to protect themselves against the risk of failing during their studies. Therefore, vocational training seems to be an attractive alternative for these individuals after their Abitur even if they still intend to take up academic studies later. However, if this «detour» proves to be more attractive for them than they had expected, these individuals might decide not to go on to university or polytechnic (Fachhochschule) at all.

Empirically, Büchel and Helberger (1995) show that compared to individuals who have only a single qualification, individuals who have completed both vocational training and subsequent studies at a university need more time to find a job that fits their qualification level. In addition, Büchel's and Helberger's estimations of augmented Mincer-type earnings functions reveal significantly lower earnings for individuals with double qualifications at least at the start of their working life.[3] Considering the higher individual opportunity costs of extended educational paths and the fact that individual and company investments in firm-specific and occupation-specific training are at least partially lost when an individual commences higher education after having completed in-firm vocational training, the authors argue that the decision to go into vocational training is influenced by risk considerations. Therefore, Büchel and Helberger (1995) interpret these individual wage losses as premia for risks associated with taking up studies at a university or a polytechnic.

In addition to these risk considerations Büchel and Helberger (1995) also take up the argument put forward by Buttler and Tessaring (1993) who stated that education can no longer be regarded as qualifying for a certain occupation but is rather a means for improving the overall occupational options of an individual. The participation in education allows delaying the decision concerning the choice of a certain occupation for as long as possible and at the same time obtaining the best possible option for oneself. As already mentioned, in this context it is the great advantage of the Abitur that it leaves all career paths open. Accordingly, the individual decision on whether or not to choose a double qualification is influenced by the expected employment prospects alongside with the contents and the conditions of the respective training courses in the region. Thus, we are inclined to expect a positive effect of a double qualification on various dimensions of job satisfaction.

Lewin et al. (1996, 432) pointed out that doing an apprenticeship is attractive to Abitur holders particularly because it provides important practical experience at the beginning of a career. This practical experience can be supplemented by acquiring theoretical knowledge at a university later. In line with the argument put forward by Jacobs (2007) who argued that sometimes employment is entered in order to obtain

3 The results obtained by Büchel and Helberger (1995) are not corroborated by the studies of Lewin et al. (1996) and Bellmann et al. (1996) which consider longer time periods and not only labour market entry. See Büchel (1997) for the importance of that distinction.

better information about the returns to higher education, Behrens et al. (2008) state that apprenticeship training is useful for vocational guidance. Bellmann and Janik (2010) found a positive and highly significant impact of the Abitur mark on the probability of an individual gaining a double qualification. Individuals tend to choose a double qualification strategy especially in professional fields where there are «related» occupations in Germany's dual system of vocational training.

Job matching and job search theories describe the typical problem of a worker searching for a job in a decentralized labour market (Jovanovic, 1979; Viscusi, 1979; Mortensen, 1988). They assume that information about relevant job characteristics is recognized as being imperfect and therefore needs to be gathered from experience on the labour market. While Sicilian (1995) studies the impact of job matching on wages, Belfield and Harris (2002) investigate how job matching and search influence job satisfaction. Thereby they test whether job satisfaction is enhanced by a better match of workers to firms. They point out that, ceteris paribus, better matches are available to individuals who have more labour market information. Thus, the probability of finding a «good match» between the worker's abilities and the firm's requirement concerning a specific job is increasing with the age of a worker and her amount of labour market experience. During the process of searching for a job an individual considers different dimensions of job satisfaction, like for example satisfaction with wages, working time, physical working conditions and working climate (Warr, 1999, Belfield & Harris, 2002). The probability of a «good match» resulting from job search seems to be higher if an individual starts searching immediately after or even before she gains the Abitur and long before her graduation from university.

Career success can be measured by using objective and subjective measures: While wages are seen as an objective measure, job satisfaction in its various dimensions is seen as a subjective measure. There is empirical evidence available concerning various aspects of job satisfaction, as for example evidence concerning higher levels of job satisfaction for women compared to men, but also evidence concerning the impact of age; actual experience; migration background; realized wage; and the residual wage computed from an earnings function as predicted minus realized wage (see Clark & Oswald, 1996; Sloane & Williams, 2000; FitzRoy et al., 2011). According to these studies, the lower the realized wage of an individual is compared to her predicted wage, the less satisfied she should be with her realized wage.

3. Data set and descriptive results

The impact of double qualifications on different dimensions of career success is investigated in the paper at hand by using data from the BiBB/BAuA Employee Survey 2006. The data have been collected from October 2005 until March 2006 by means of a representative computer-assisted telephone interview (CATI) of 20,000 employees in Germany. The survey was restricted to individuals in paid employment aged 15 or above. Trainees as well as employees working less than ten hours per

week on a regular basis have been excluded. The questionnaire was developed by the Federal Institute for Vocational Education and Training (Bundesinstitut für Berufsbildung, BiBB) and the Federal Institute for Occupational Safety and Health (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, BAuA). The main goal of the survey was to collect information on the employees' job characteristics and their «educational biography». Therefore, questions also have been asked concerning the types of education of the respondents as well as apprenticeship training and further training which led to a vocational qualification.[4]

The results in this paper refer to workers who have passed the Abitur or the Fachabitur (German certificate of aptitude for specialized higher education, e.g. at a polytechnic) and have gained their school-leaving certificate in Germany. The sample therefore contains only workers who – after having passed their Abitur or Fachabitur examinations – went straight on to university or first completed a course of vocational training in the dual system and went on to university afterwards.[5] This group accounts for about 60% of all individuals who are passing the Abitur. Most of the remaining third of the employees surveyed in the BiBB/BAuA Employee Survey 2006 had completed either a training course in the dual system of vocational training (some of them expanding this with a further training qualification afterwards) or a course of vocational training within the education system (e.g. at a Berufsfachschule); furthermore, some of them had not (yet) gained a qualification. Table A1 in the appendix gives the descriptive information about the individuals covered by the analyses.

As can be seen in Table 1, compared to male graduates the percentage of female graduates who have a double qualification is more than ten percentage points lower. This might be rooted, e.g. in differing occupational decisions or school performance. Since this result presumably reflects deeper gender-specific differences which also show up, e.g. in the gender wage gap and the fact that women consistently express themselves as being more satisfied with their jobs than men,[6] we conduct the further analyses separately by gender.

4 Further information about the data set and the methodology can be found in Rohrbach (2009) and Zopf and Tiemann (2010) or at www.BIBB.de/arbeit-im-wandel.

5 Since the focus of our paper is on the validity of the hypothesis put forward by Büchel and Helberger (1995) we exclude all educational paths other than the ones mentioned above. School-based vocational training is also excluded due to its limited comparability. Of course, we cannot exclude the possibility that certain individuals decide about their different educational steps at different points in time, i.e. at the point in time when they start a vocational education certain individuals might not already intend to study at a university afterwards.

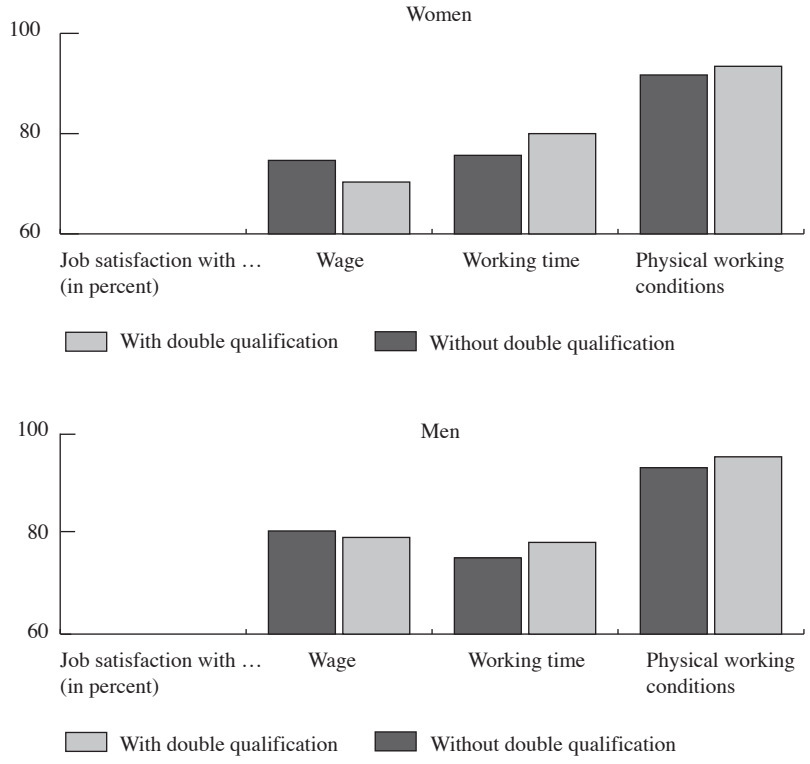
6 See, e.g. Clark (1997), Sloane & Williams (1996).

Table 1: Double qualifications of university and polytechnic graduates, by gender and region

	Double qualification	Without double qualification
Total	27%	73%
Women	21%	79%
Men	32%	68%
Western Germany	26%	74%
Eastern Germany	32%	68%

Source: own calculations based on the BIBB/BAuA Employee Survey 2006

Figure 1: Double qualifications and job satisfaction of women and men along selected dimensions of job satisfaction, percentage of «satisfied» and «very satisfied» ratings



Source: own calculations based on the BIBB/BAuA Employee Survey 2006

Figure 1 shows that the proportion of workers who are satisfied with their hourly wage is lower for workers with double qualifications than for workers without double qualifications. However, the proportion of workers who are satisfied with their working time and their physical working conditions is higher for workers with double qualifications than for workers without double qualifications. Therefore, we are considering not only the overall level of job satisfaction but also the various dimensions of job satisfaction of women and men.

4. Multivariate analyses

4.1 Empirical strategy and model specification

The dependent variables in our models are the overall job satisfaction and the job satisfaction measured along eleven single dimensions. Our research goal is the analysis of the effect of a double qualification on various dimensions of job satisfaction. The dummy variable indicating whether or not an individual has a double qualification is defined in the following way: it takes the value 0 if the individual went to university immediately after leaving school and the value 1 if she first completed a vocational training in the dual system and went on to university afterwards.

However, since an individual's decision to go for a double qualification might also be influenced by her (expected) later job satisfaction, the empirical results for the effect of the double qualification dummy might be biased. In order to account for this potential endogeneity, we instrument the double qualification dummy by using the predicted probability of having a double qualification. We estimate this predicted probability of having a double qualification by a simple probit regression, using the specification presented in Bellmann and Janik (2010). Double qualifications are expected to occur above all in the technical fields of study (e.g. metal and electrical occupations followed by a degree course in engineering) and in natural sciences or the humanities (e.g. commercial training and a degree course in economics). In contrast, in the field of health and education the number of relevant occupations in the dual system of vocational training is rather limited (e.g. doctor's assistant). In this occupational field it is therefore less likely that the training occupation is related in content to a subsequent degree course.

As it is common practice for earnings analyses and for job satisfaction studies, we control for actual experience, actual experience squared and migration background.[7] We also include tenure in the earnings equation. In addition, we use age and age squared as independent variables in the satisfaction equation. Furthermore, in the earnings function we include dummy variables for good, fair and satisfactory Abitur marks as well as a group of dummy variables indicating differences in individual career aspirations in order to account for individual ability and motivation. In the job

7 In the BIBB/BAuA Employee Survey 2006 there are several ethnic characteristics available. We therefore control for the nationality of an employee (German: yes/no) as well as for her mother tongue (German: yes/no). Including the latter characteristic is useful for identifying potential effects for migrants who do possess the German citizenship.

satisfaction regressions we include the Abitur mark dummy variables as well as the residual wage computed from the earnings function as predicted minus realized wage (see Clark & Oswald, 1996, and Sloane & Williams, 2000).

Furthermore, the number of direct subordinates, the individual's assessment of her work/life balance, the incidence of further training, and the perceived risk of dismissal are integrated in order to control for differences in job characteristics which are relevant for the hourly wage and the job satisfaction of an individual. The type of establishment in which the respondents of the survey are employed in is described by dummy variable groups indicating the firm size, the economic sector, and by a dummy variable indicating whether the firm is located in Eastern or Western Germany.

In principle, it would be of interest to assess the impact of the field of study on the earnings and the job satisfaction of an individual, too. However, the dummy variables indicating the field of study are jointly insignificant in the respective regressions which contain the double qualification dummy.[8] Furthermore, the individual decision to take up a double qualification could also induce her to choosing a certain field of study. However, our data set does not allow us to model neither the occupational choice of an individual nor the effect of numerus clausus regulations.

4.2 Estimation results

Table 2 presents the marginal effects of the determinants of the probability of university and polytechnic graduates having a double qualification. Compared to women with a very good Abitur mark, women with worse Abitur marks have a significantly higher probability of having a double qualification; for men, the Abitur mark dummy variables are not significant at conventional levels. Thus, the risk considerations of Büchel and Helberger (1995) are corroborated for women only. For both sexes the dummy variables indicating the field of study are single and jointly significant. The results indicate that double qualifications occur more often in occupational fields which have «related» occupations in the dual system of vocational training.

8 In addition, in case one includes the dummy variables indicating the field of study in the regressions explaining earnings and job satisfaction, it is not possible any longer to control for the potential endogeneity of having a double qualification by including the predicted probability of having a double qualification.

Table 2: Probability of university and polytechnic graduates having a double qualification (1 = yes), probit regression by gender, marginal effects

	Women		Men	
Abitur mark good (1 = yes)	0.253	**	0.078	
	(0.124)		(0.126)	
Abitur mark fair/satisfactory (1 = yes)	0.414	***	0.202	
	(0.141)		(0.134)	
Technical degree course (1 = yes)	0.677	***	0.655	***
	(0.146)		(0.109)	
Degree course in sciences (1 = yes)	0.542	***	0.501	***
	(0.108)		(0.117)	
Other field of study (1 = yes)	0.538	***	0.299	**
	(0.118)		(0.130)	
Constant	–1.408	***	–1.053	***
	(0.127)		(0.154)	
Significance of the model	χ^2 (5) = 44.883	***	χ^2 (5) = 41.704	***
Observations	1,390		1,823	
Joint significance of dummy variable groups	Abitur mark field of study	** ***	Abitur mark field of study	n.s. ***

Notes: Heteroscedasticity-consistent standard errors in parentheses, reference categories of dummy variable groups: Abitur mark very good, health/social studies. Significance levels: * p<0.1; ** p<0.05; *** p<0.01; n.s. denotes statistical insignificance. Source: own calculations based on the BIBB/BAuA Employee Survey 2006

In Table 3 the estimates for the earnings functions of women and men are shown. The coefficient of the double qualification dummy as well as the coefficient of the predicted probability of having a double qualification is insignificant for women and men. Furthermore, the estimates and the significance levels for the other coefficients exhibit the usual patterns. Women and men whose mother tongue is German earn significantly more. The amount of actual experience and tenure exerts a highly significant and positive impact, whereas the amount of actual experience squared has a negative effect. The number of subordinates has a highly significant positive effect for women and men. Hourly wages of women and men are significantly higher in larger firms. Compared to wages earned in craft, remuneration is better in the other industry sectors which have been included, albeit the effects are not always significant. Earnings in Eastern Germany are significantly lower. A fair or satisfactory Abitur mark is associated with statistically significant lower wages for men only. Overall, the significantly negative impact of a double qualification on individual earnings as found by Büchel and Helberger (1995) cannot be confirmed.

Table 3: Log hourly wage of university and polytechnic graduates, OLS regressions by gender

	Women				Men			
	incl. dummy for double qualification (1 = yes)		incl. predicted probability of having double qualification		incl. dummy for double qualification (1 = yes)		incl. predicted probability of having double qualification	
Double qualification (1 = yes)	0.001 (0.030)		– –		–0.024 (0.020)		– –	
Predicted probability of having a double qualification	– –		–0.157 (0.192)		– –		0.178 (0.154)	
Foreigner (1 = yes)	–0.038 (0.078)		–0.036 (0.078)		0.099 (0.066)		0.104 (0.065)	
Mother tongue German (1 = yes)	0.132 (0.060)	**	0.132 (0.060)	**	0.205 (0.055)	***	0.201 (0.054)	***
Actual experience, in years	0.028 (0.005)	***	0.028 (0.005)	***	0.032 (0.004)	***	0.031 (0.004)	***
Actual experience, in years, squared	–0.001 (1.1e-04)	***	–0.001 (1.1e-04)	***	–0.001 (1.0e-04)	***	–0.001 (1.0e-04)	***
Tenure, in years	0.009 (0.002)	***	0.009 (0.002)	***	0.007 (0.002)	***	0.008 (0.002)	***
Number of direct subordinates, in 100	8.74e-07 (1.23e-07)	***	8.77e-07 (1.22e-07)	***	4.01e-06 (1.67e-06)	**	3.93e-06 (1.62e-06)	**
20–99 employees (1 = yes)	0.075 (0.032)	**	0.074 (0.031)	**	0.056 (0.030)	*	0.057 (0.030)	*
100–499 employees (1 = yes)	0.145 (0.037)	***	0.152 (0.038)	***	0.158 (0.032)	***	0.151 (0.032)	***
More than 500 employees (1 = yes)	0.205 (0.039)	***	0.214 (0.041)	***	0.256 (0.030)	***	0.249 (0.030)	***
Public service (1 = yes)	0.359 (0.138)	***	0.344 (0.140)	**	0.047 (0.054)		0.070 (0.056)	
Manufacturing (1 = yes)	0.419 (0.144)	***	0.413 (0.145)	***	0.197 (0.055)	***	0.201 (0.055)	***
Trade (1 = yes)	0.075 (0.152)		0.070 (0.153)		–0.005 (0.073)		0.005 (0.073)	
Other services (1 = yes)	0.336 (0.141)	**	0.328 (0.142)	**	0.143 (0.054)	***	0.153 (0.054)	***
Other sectors (1 = yes)	0.262 (0.148)	*	0.250 (0.150)	*	0.028 (0.065)		0.043 (0.066)	
Eastern Germany (1 = yes)	–0.180 (0.029)	***	–0.176 (0.030)	***	–0.214 (0.027)	***	–0.218 (0.027)	***
Abitur mark good (1 = yes)	–0.012 (0.033)		–0.001 (0.034)		–0.056 (0.033)	*	–0.064 (0.033)	*
Abitur mark fair/ satisfactory (1 = yes)	–0.040 (0.042)		–0.024 (0.041)		–0.092 (0.036)	**	–0.108 (0.037)	***
Constant	1.964 (0.154)	***	1.996 (0.163)	***	2.305 (0.084)	***	2.248 (0.104)	***
Significance of the model	F(18) = 21.034	***	F(18) = 21.071	***	F(18) = 37.209	***	F(18) = 36.677	***
Observations	1,313		1,313		1,743		1,743	
Joint significance of dummy variable groups	Establishment size industry sector Abitur mark	*** *** n.s.	Establishment size industry sector Abitur mark	*** *** n.s.	Establishment size industry sector Abitur mark	*** *** **	Establishment size industry sector Abitur mark	*** *** ***

Notes: Heteroscedasticity-consistent standard errors in parentheses, reference categories of dummy variable groups: 1–19 employees, craft, Abitur mark very good. Significance levels: * p<0.1; ** p<0.05; *** p<0.01; n.s. denotes statistical insignificance. Source: own calculations based on the BIBB/BAuA Employee Survey 2006

Next, following Tuor and Backes-Gellner (2010) and Backes-Gellner et al. (2010) we investigate whether there are systematic differences between the wage risk of individuals who do have double qualifications and individuals who do not have double qualifications. As a risk measure, we use an average squared coefficient of variance as suggested by Tuor and Backes-Gellner (2010).[9] This coefficient of variance measures the wage risk by the variations in relation to the respective level of wages. The rationale behind this is that a given amount of variation has more severe consequences for individuals with low wages than for individuals with higher wages. Interestingly, our results which are presented in Table 4 show that although the wage risk for women is larger than for men, the educational paths chosen by women do not affect their wage risk substantially. In contrast, in line with the hypothesis put forward by Büchel and Helberger (1995) the wage risk for men is comparatively higher if they do not take up double qualifications.

Table 4: Wage risk measure by gender and double qualification

	Women	Men
With double qualification	0.211	0.111
Without double qualification	0.209	0.149

Source: own calculations based on the BIBB/BAuA Employee Survey 2006

Turning to the analysis of job satisfaction in Table 5, we find that a significantly negative impact of the predicted probability of having a double qualification could also not be found in the ordered probit regressions for the overall job satisfaction of women and men. While the effect of this predicted probability on the overall job satisfaction of an individual is negative but insignificant for women, for men this variable has a positive effect which is significant at the 10%-level. Furthermore, some additional regressors exhibit significant coefficients: for example, the residual wage which has been computed by means of the wage regressions in Table 3 reveals a significantly negative impact on the overall job satisfaction. The number of direct subordinates has a significantly positive effect for women and men. While men are significantly more satisfied when working in larger firms, women's job satisfaction is not affected by firm size. For both women and men the dummy variables describing the individual work/life balance show significant effects in the expected direction. In addition, for both sexes the dummy variable group which describes the perceived risk of dismissal reveals a significantly negative effect on the overall job satisfaction of a worker. The results are in line with the differences in the risk attitudes of women and men which have been reported by Dohmen et al. (2011) on the basis of the German Socio-Economic Panel.

9 The risk measure R_j for a group j is calculated as follows: $R_j = \frac{1}{N_j} \sum_{i=1}^{N_j} (\frac{Y_{ij} - \widehat{Y}_{ij}}{\widehat{Y}_{ij}})^2$, where i denotes an individual, j denotes the group an individual belongs to (i.e. women with double qualifications; men with double qualifications; women without double qualifications; men without double qualifications), N_j is the number of cases in group j, and Y_{ij} and $\widehat{Y}_{ij}$ denotes the wage and the predicted wage of an individual, respectively. $\widehat{Y}_{ij}$ has been calculated from the earnings function presented in Table 3.

Table 5: Overall job satisfaction of university and polytechnic graduates, ordered probit regressions by gender (1 = not/little satisfied, 2 = satisfied, 3 = very satisfied)

	Women				Men			
	incl. dummy for double qualification (1 = yes)		incl. predicted probability of having double qualification		incl. dummy for double qualification (1 = yes)		incl. predicted probability of having double qualification	
Double qualification (1 = yes)	0.029 (0.109)		– –		0.071 (0.077)		– –	
Predicted probability of having a double qualification	– –		–0.025 (0.625)		– –		1.084 (0.579)	*
Log residual wage	–0.391 (0.131)	***	–0.391 (0.131)	***	–0.398 (0.123)	***	–0.389 (0.124)	***
Age	–0.075 (0.064)		–0.073 (0.064)		–0.085 (0.056)		–0.080 (0.056)	
Age squared	0.001 (0.001)		0.001 (0.001)		0.001 (0.001)	*	0.001 (0.001)	
Actual experience, in years	0.031 (0.026)		0.031 (0.026)		0.017 (0.023)		0.016 (0.023)	
Actual experience, in years, squared	–0.001 (0.001)		–4.9e-04 (0.001)		–4.1e-04 (0.001)		3.7e-04 (0.001)	
Tenure, in years	–0.003 (0.008)		–0.003 (0.008)		–0.005 (0.006)		–0.004 (0.006)	
Number of direct subordinates, in 100	2.8e-05 (1.7e-05)	*	2.8e-05 (1.7e-05)	*	2.7e-05 (1.5e-05)	*	2.8e-05 (1.5e-05)	*
20–99 employees (1 = yes)	–0.192 (0.125)		–0.194 (0.125)		0.242 (0.119)	**	0.242 (0.119)	**
100–499 employees (1 = yes)	–0.125 (0.135)		–0.126 (0.135)		0.267 (0.119)	**	0.258 (0.120)	**
More than 500 employees (1 = yes)	0.055 (0.144)		0.057 (0.145)		0.365 (0.120)	***	0.354 (0.120)	***
Industry sector dummy variables (5)	n.s.		n.s.		n.s.		n.s.	
Fixed-term contract (1 = yes)	0.219 (0.149)		0.216 (0.149)		0.053 (0.154)		0.069 (0.156)	
Eastern Germany (1 = yes)	–0.022 (0.100)		–0.021 (0.100)		0.023 (0.098)		0.025 (0.099)	
Work/life balance sometimes given (1 = yes)	–0.400 (0.096)	***	–0.401 (0.096)	***	–0.365 (0.074)	***	–0.360 (0.074)	***
Work/life balance never given (1 = yes)	–0.620 (0.186)	***	–0.621 (0.187)	***	–0.427 (0.227)	*	–0.416 (0.228)	*
Little risk of dismissal (1 = yes)	–0.185 (0.104)	*	–0.185 (0.104)	*	–0.359 (0.083)	***	–0.364 (0.083)	***
High risk of dismissal (1 = yes)	–0.514 (0.200)	**	–0.514 (0.200)	**	–0.761 (0.200)	***	–0.756 (0.201)	***
Very high risk of dismissal (1 = yes)	–0.304 (0.238)		–0.302 (0.239)		–0.826 (0.274)	***	–0.841 (0.278)	***
Further training during last 2 years (1 = yes)	0.036 (0.107)		0.035 (0.108)		0.096 (0.087)		0.103 (0.087)	

(Table 5 continued)

Abitur mark good (1 = yes)	–0.013 (0.107)		–0.008 (0.112)		–0.002 (0.109)		–0.038 (0.111)	
Abitur mark fair/ satisfactory (1 = yes)	–0.079 (0.137)		–0.070 (0.151)		–0.135 (0.121)		–0.210 (0.129)	
Career not important (1 = yes)	–0.011 (0.136)		–0.012 (0.136)		–0.190 (0.146)		–0.200 (0.145)	
Career of little importance (1 = yes)	–0.071 (0.102)		–0.071 (0.102)		–0.055 (0.087)		–0.052 (0.086)	
Career very important (1 = yes)	0.070 (0.158)		0.070 (0.158)		0.071 (0.113)		0.072 (0.113)	
Career of utmost importance (1 = yes)	–0.305 (0.275)		–0.305 (0.275)		0.155 (0.234)		0.184 (0.233)	
Cut 1 Constant	–2.744 (1.233)	**	–2.731 (1.244)	**	–3.206 (1.106)	***	–2.784 (1.131)	**
Cut 2 Constant	–0.670 (1.228)		–0.656 (1.240)		–1.073 (1.103)		–0.647 (1.129)	
Significance of the model	χ^2 (30) = 67.11	**	χ^2 (30) = 67.19	***	χ^2 (30) = 111.87	***	χ^2 (30) = 113.76	***
Observations	774		774		1,125		1,125	
Joint significance of dummy variable groups	Firm size	n.s.	Firm size	n.s.	Firm size	**	Firm size	**
	industry sector	n.s.	industry sector	n.s.	industry sector n	n.s.	industry sector	n.s.
	extent work/life balance	***	extent of work/life balance	***	extent of work/life balance	***	extent of work/life balance	***
	risk of dismissal	*	risk of dismissal	*	risk of dismissal	***	risk of dismissal	***
	Abitur mark	n.s.	Abitur mark	n.s.	Abitur mark n	n.s.	Abitur mark	n.s.
	importance of one's own career	n.s.	importance of one's own career	n.s.	importance of one's own career	n.s.	importance of one's own career	n.s.

Notes: Heteroscedasticity-consistent standard errors in parentheses, reference categories of the dummy variable groups: 1–19 employees, work/life balance often given, no risk of dismissal, Abitur mark very good, career important. Log residual wage computed as log predicted wage minus log actual wage. Significance levels: * p<0.1; ** p<0.05; *** p<0.01; n.s. denotes statistical insignificance. Source: own calculations based on the BIBB/BAuA Employee Survey 2006

Table 6 presents the effect of the predicted probability of having a double qualification on eleven single dimensions of job satisfaction. The results show that a double qualification exerts a significantly positive impact on job satisfaction for both women and men concerning one dimension of job satisfaction (i.e. job satisfaction with the physical working conditions), for women alone concerning one dimension (i.e. job satisfaction with working time) and for men alone concerning four dimensions (i.e. job satisfaction with wage; working equipment; working rooms; working climate). However, no significantly negative impact of the predicted probability of having a double qualification on one of the eleven single dimensions of job satisfaction can be found.

Interestingly, compared to women without double qualifications women with double qualifications seem to be more satisfied with the working time associated with their job. This probably means that they are more successful in finding a job which allows them to balance work and family obligations. In contrast, men with double qualifications are more satisfied with their wage than men without double qualifications. Thus, we regard these results as supportive arguments for the hypothesis which we derived from job matching, job shopping and search theories. This hypothesis states that for individuals who have more labour market information bet-

ter matches between their individual capabilities and the job requirements are available.

In accordance with our positive but sometimes insignificant results for the effects of double qualifications on wages and overall job satisfaction we find several positive effects of double qualifications on various single dimensions of job satisfaction. Thus, our empirical results again do not corroborate those obtained by Büchel and Helberger (1995) who underlined that risk considerations are decisive for the educational steps of an individual.

Table 6: Effect of the predicted probability of having a double qualification and the log residual wage on various dimensions of job satisfaction; ordered probit regressions by gender (1 = not/little satisfied, 2 = satisfied, 3 = very satisfied)

	Independent variables: Predicted probability of having a double qualification and log residual wage							
	Women				Men			
Ordered dependent variables: Single dimensions of job satisfaction (1 = not/little satisfied, 2 = satisfied, 3 = very satisfied)	Predicted probability of having a double qualification		Log residual wage		Predicted probability of having a double qualification		Log residual wage	
Overall job satisfaction	–0.025 (0.625)		–0.391 (0.131)	***	1.084 (0.579)	*	–0.389 (0.124)	***
Job satisfaction with ... Wage	–0.177 (0.629)		–1.279 (0.140)	***	1.300 (0.636)	**	–1.487 (0.141)	***
Boss	–0.647 (0.602)		0.025 (0.128)		–0.518 (0.566)		0.044 (0.111)	
Working time	1.414 (0.639)	**	–0.215 (0.114)	*	0.541 (0.599)		–0.246 (0.116)	**
Career opportunities	–0.400 (0.655)		–0.254 (0.135)	*	0.489 (0.614)		–0.424 (0.129)	***
Physical working conditions	1.644 (0.627)	***	–0.534 (0.130)	***	1.651 (0.608)	***	–0.315 (0.138)	**
Further training	–0.943 (0.635)		–0.364 (0.117)	***	–0.294 (0.596)		–0.515 (0.121)	***
Working equipment	0.464 (0.648)		–0.236 (0.125)	*	1.288 (0.608)	**	–0.106 (0.122)	
Application of one's skills	–0.783 (0.606)		–0.440 (0.127)	***	0.637 (0.570)		–0.533 (0.119)	***
Working rooms	0.906 (0.634)		–0.251 (0.124)	**	1.139 (0.596)	*	–0.235 (0.102)	**
One's own function	–0.396 (0.622)		–0.408 (0.126)	***	0.323 (0.609)		–0.504 (0.128)	***
Working climate	0.538 (0.623)		–0.116 (0.122)		1.188 (0.558)	**	0.114 (0.112)	

Notes: Heteroscedasticity-consistent standard errors in parentheses. Log residual wage calculated as log predicted wage minus log actual wage. Control variables included: age, age squared, experience, experience squared, tenure, number of subordinates, establishment size, industry sector, fixed-term contract, East Germany, extent of work/life balance, risk of dismissal, further training during the last 2 years, Abitur mark, importance of one's own career. Significance levels: * p<0.1; ** p<0.05; *** p<0.01. Source: own calculations based on the BIBB/BAuA Employee Survey 2006

In addition, Table 6 also shows the effects of the log residual wage on the eleven single dimensions of job satisfaction. The log residual wage has been computed from the earnings function as log predicted wage minus log realized wage. As expected, the effect of the log residual wage on the overall job satisfaction and on most of the other single dimensions of job satisfaction is significantly negative. For women ten significantly negative coefficients and for men nine significantly negative coefficients have been obtained.

Taken together, the effect of the Abitur mark as a determinant of the probability of women gaining a double qualification corroborates the risk considerations of Büchel and Helberger (1995). However, the results for men in the respective regression and the results obtained for the effect of double qualifications on wages and overall job satisfaction as well as on various other dimensions of job satisfaction are not in line with these risk considerations. Therefore, we are inclined to accept the arguments which have been proposed by Büchel and Helberger (1995) as being relevant only for the women's career decisions right after the Abitur. For women's later careers and for men's careers in general we follow the arguments put forward by Buttler and Tessaring (1993) who regard education as a means to improve one's overall occupational options. We are also inclined to accept the arguments put forward by Lewin et al. (1996) who stated that an apprenticeship provides practical experience which can be supplemented by acquiring theoretical knowledge at the university later. As suggested by job matching and job shopping theories the probability of finding a «good match» between the individual's abilities and the job characteristics is increasing with the age and the amount of labour market experience of an individual. The probability of a «good match» resulting from job search seems to be higher if the search starts immediately after or even before the Abitur is gained and long before graduating from university.

Our empirical results are compatible with the hypothesis that individuals who have obtained a double qualification are better equipped with relevant job information. A double qualification therefore improves the quality of the match between the worker and the firm and increases individual job satisfaction along several dimensions (albeit not always significantly).

5. Conclusions

This paper discusses the role of the pre-academic vocational training of graduates, a phenomenon which has reached a relevant dimension in Germany: the percentage of individuals commencing vocational training after having gained the Abitur as their highest school qualification has increased from 14% in the year 2002 to 21% in the year 2010. By using the BiBB/BAuA Employee Survey 2006 we estimate various regressions which include hourly wages, overall job satisfaction and various single dimensions of job satisfaction as dependent variables. As independent variables, we include a dummy variable indicating whether an individual has a double qualification as well as a large set of control variables. In addition, we also take into account

the possible endogeneity of the probability of a graduate gaining a double qualification by instrumenting this probability with several dummy variables for the Abitur mark and the field of study.

The fact that – compared to women with a very good Abitur mark – women with worse Abitur marks have a significantly higher probability of gaining a double qualification corroborates the risk considerations of Büchel and Helberger (1995). The wage risk coefficient which has been calculated following Tuor and Backes-Gellner (2010) exhibits a lower value for men with double qualifications compared to men without double qualifications. This result is also in line with the hypothesis put forward by Büchel and Helberger (1995).

However, the impact of the Abitur mark on the probability of having a double qualification is insignificant for men. Furthermore, our results obtained for the effect of double qualifications on wages and on overall job satisfaction as well as on various single dimensions of job satisfaction are not in accordance with the risk considerations by Büchel and Helberger (1995): the effects of the predicted probability of having a double qualification on various dimensions of job satisfaction are either significantly positive or insignificant, but never significantly negative. These results underline the relevance of job matching, job shopping and search for gaining information on the individual's capabilities and on the firm's requirements as well as on wages and working conditions. In addition, our results are compatible with the argument put forward by Buttler and Tessaring (1993) which states that education improves the overall educational options of an individual. All of these aspects are highly relevant for an individual's wage and job satisfaction.

Since the field of study has proved to influence the probability of having a double qualification, it might be interesting to consider the effect of the field of study on earnings and job satisfaction, too. However, since we are not able to take into account the possible endogeneity of the probability of having a double qualification we refrain from such an extension of our paper. Furthermore, the analyses of the possible effects of double qualifications on other labour market aspects, as for example on the choice of the field of study of an individual, are beyond the scope of this paper.

Of course, data from the Employment Statistics Register, the Micro Census and the National Education Panel Survey (NEPS) can be used to assess the robustness of our results. For example, in some waves of the NEPS the Abitur mark will be available. However, the BIBB/BAuA Employee Survey 2006 has the advantage of providing information both on the Abitur mark and on various dimensions of job satisfaction, an advantage which is exploited in the study at hand.

Summing up, our results suggest that additional investigations are needed. Since double qualifications are widespread among young workers in Germany, special labour market studies designed as panels are necessary to take into account the unobserved individual heterogeneity as well as the socio-economic background of a worker.

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Appendix

Table A1: Summary statistics of variables in the sample

	Women			Men		
Variable	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Individual and job characteristics						
Double qualification (1 = yes)	1,404	0.21	0.40	1,849	0.32	0.47
Predicted probability of having a double qualification	1,798	0.21	0.08	2,211	0.31	0.08
Hourly wage in €	1,995	17.82	7.57	2,407	21.30	8.58
Log of hourly wage	1,995	2.79	0.44	2,407	2.98	0.43
Residual wage	1,313	–1.32	6.81	1,743	–0.97	7.31
Log of residual wage	1,313	–0.01	0.39	1,743	0.01	0.35
Age	2,009	41.63	9.64	2,445	42.98	9.40
Age squared	2,009	1825.83	818.63	2,445	1935.93	826.52
Mother tongue German (1 = yes)	2,009	0.95	0.23	2,445	0.95	0.22
Foreigner (1 = yes)	2,009	0.03	0.18	2,445	0.03	0.17
Actual experience, in years	1,990	16.40	10.09	2,430	18.30	10.18
Actual experience, in years, squared	1,990	370.89	383.64	2,430	438.35	419.87
Tenure, in years	2,008	11.11	9.65	2,444	11.61	9.40
Number of direct subordinates in 100	2,007	725.06	16828.18	2,438	1232.86	8607.23
Eastern Germany (1 = yes)	2,009	0.23	0.42	2,445	0.18	0.38
Abitur mark	1,986	2.95	0.65	2,411	2.81	0.66
Abitur mark fair/satisfactory (1 = yes)	1,986	0.22	0.42	2,411	0.30	0.46
Abitur mark good (1 = yes)	1,986	0.60	0.49	2,411	0.57	0.50
Abitur mark very good (1 = yes)	1,986	0.18	0.38	2,411	0.13	0.33
Technical degree course (1 = yes)	1,818	0.10	0.29	2,244	0.38	0.49
Degree course in sciences (1 = yes)	1,818	0.27	0.44	2,244	0.27	0.45
Other field of study (1 = yes)	1,818	0.19	0.39	2,244	0.15	0.36
Health/social studies (1 = yes)	1,818	0.45	0.50	2,244	0.19	0.39
Overall job satisfaction (1 = not/little satisfied, 2 = satisfied, 3 = very satisfied)	2,009	2.19	0.56	2,444	2.23	0.57
Job satisfaction with … (1 = not/little satisfied, 2 = satisfied, 3 = very satisfied)						
… wage	2,007	1.88	0.63	2,439	1.93	0.57
… boss	1,748	2.12	0.69	2,002	2.13	0.67
… working time	2,008	1.95	0.64	2,443	1.90	0.61
… career opportunities	1,766	1.61	0.58	2,032	1.61	0.59

(Table A1 continued)

… physical working conditions	2,001	2.14	0.54	2,424	2.22	0.55
… further training	2,000	1.96	0.68	2,431	1.99	0.68
… working equipment	2,006	1.90	0.66	2,440	2.04	0.66
… application of one's own skills	2,006	2.14	0.63	2,442	2.17	0.62
… working rooms	2,005	1.99	0.71	2,437	2.08	0.71
… one's own function	2,007	2.28	0.61	2,442	2.31	0.59
… working climate	1,900	2.26	0.65	2,301	2.23	0.66
Work/life balance often given (1 = yes)	2,004	0.62	0.49	2,440	0.58	0.49
Work/life balance sometimes given (1 = yes)	2,004	0.34	0.47	2,440	0.37	0.48
Work/life balance never given (1 = yes)	2,004	0.05	0.21	2,440	0.05	0.21
Risk of dismissal	1,411	1.91	0.77	1,878	1.82	0.68
No risk of dismissal (1 = yes)	1,411	0.28	0.45	1,878	0.30	0.46
Low risk of dismissal (1 = yes)	1,411	0.57	0.49	1,878	0.60	0.49
High risk of dismissal (1 = yes)	1,411	0.09	0.28	1,878	0.06	0.24
Very high risk of dismissal (1 = yes)	1,411	0.06	0.23	1,878	0.03	0.18
Further training during last 2 years (1 = yes)	2,008	0.76	0.43	2,445	0.75	0.43
Career not important (1 = yes)	2,003	0.16	0.37	2,442	0.13	0.33
Career of little importance (1 = yes)	2,003	0.33	0.47	2,442	0.28	0.45
Career important (1 = yes)	2,003	0.35	0.48	2,442	0.41	0.49
Career very important (1 = yes)	2,003	0.11	0.32	2,442	0.14	0.35
Career of utmost importance (1 = yes)	2,003	0.03	0.18	2,442	0.04	0.19
Fixed-term contract (1 = yes)	1,198	0.18	0.39	1,514	0.10	0.30
Establishment characteristics						
Public services (1 = yes)	1,997	0.52	0.50	2,440	0.34	0.47
Manufacturing (1 = yes)	1,997	0.09	0.28	2,440	0.24	0.43
Craft (1 = yes)	1,997	0.01	0.11	2,440	0.03	0.16
Trade (1 = yes)	1,997	0.04	0.21	2,440	0.04	0.20
Other services (1 = yes)	1,997	0.23	0.42	2,440	0.29	0.45
Other sector (1 = yes)	1,997	0.11	0.31	2,440	0.06	0.24
Number of employees	1,948	2.26	1.06	2,394	2.51	1.13
1–19 employees (1 = yes)	1,948	0.29	0.45	2,394	0.25	0.43
20–99 employees (1 = yes)	1,948	0.34	0.48	2,394	0.25	0.44
100–500 employees (1 = yes)	1,948	0.19	0.40	2,394	0.24	0.42
More than 500 employees (1 = yes)	1,948	0.17	0.38	2,394	0.26	0.44

Source: own calculations based on the BIBB/BAuA Employee Survey 2006